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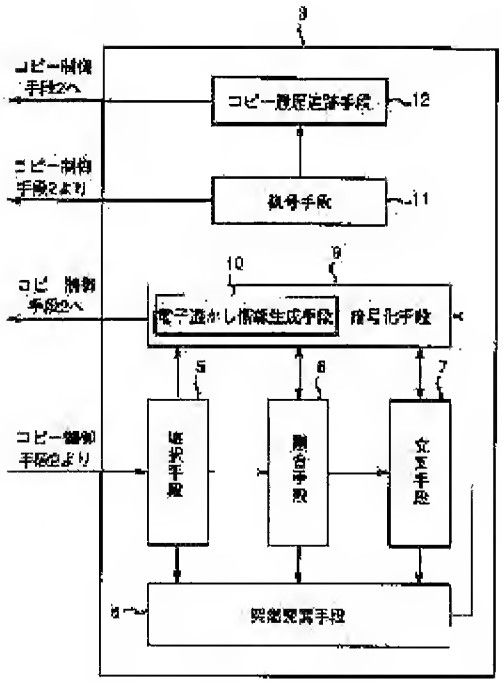
(54) CONTENTS DISTRIBUTION CONTROL DEVICE AND PROGRAM RECORDING MEDIUM



(57)Abstract:
PROBLEM TO BE SOLVED: To make it possible to inhibit illegal copy, and to ascertain the source of the illegal copy.
SOLUTION: When the ID of a copy requesting device is not registered in copy limitation information, a copy control means rejects the request for copy judging it as illegal. A copy history tracing means 12 of the contents distribution control information recording means 3, while comparing the history of contents DNA accumulated in the contents with the original contents DNA of the copying device, performs inverse procedures of harmonization by a harmonization means 6 and crossing by a crossing means 7 until it finally arrives at the original contents DNA of said contents. Thus, the source of the illegal copy is ascertained by extracting the original contents DNA of the copy device which has copied said contents.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention is accumulated into contents by setting contents distribution management information as the subject of the copy of digital contents (only henceforth contents), or the target of a contents copy,It is related with the contents distribution management device which pursues a copy subject from prevention of the illegal copy of contents, or the copied history of contents.
[0002]
[Description of the Prior Art]These days, contents are in the tendency which is unjustly copied via a network or a recording medium, and spreads with the spread of digital contents. Then, an economic organization, a working group, etc. are established for every peculiar recording medium or contents, and the preventive measure of the illegal copy is devised.
[0003]By history ** of "Takahashi, the anti-copying art of "IEEE1394 written by Naoki Asami, and a public key / common key concomitant use, for example, unification" Nikkei BP, Nikkei electronics In 1998.3.23(No.712)pp.47-pp.53." The prevention art of the 1st illegal copy as shown in the following proposed by CPTWG (Copy Protection Technical Working Group) as the anti-copying method of IEEE1394 is indicated.
[0004]That is, the information called CCI (copy control information) to contents is embedded first.Next, it is investigated whether if there is a demand of the copy from a user, the apparatus of the transmitting side which transmits contents can be copied with reference to the above CCI. Here, CCI comprises 2-bit information and the significance [CCI] is given with the value of 2 bits by "a copy is impossible", "only once being copied", "the copy beyond this not being accepted", and four kinds of the ability "for any number of times to be copied (copy permission)."
[0005]Next, the apparatus of the above-mentioned transmitting side performs attestation which checks whether the apparatus of the receiver is provided with anti-copying art. Full attestation and the attestation with restriction are one of the above-mentioned attestation. And when the both sides of the transmitting side and a receiver have a public key, it is considered as full attestation formation. In the above-mentioned full attestation, it controls to transmit the data of the contents which the copy accepted and do not shine. On the other hand, in the attestation with the above-mentioned restriction, when a copy is accepted, the contents of the above CCI control so that only "only once being copied" and the case of "any number of times can be copied" transmit contents.
[0006]Here, although the contents to which the copy was accepted may send out data, without enciphering, when transmitting and receiving the data in which the copy is not accepted, encryption is always needed. And the enciphered contents will decrypt by a public key.
[0007]By the above-mentioned CPTWG, CSS (contact scrambling system) is determined about DVD (digital video disc) as prevention art of the 2nd illegal copy.In this CSS, four kinds of anti-copying policies are given. A one-eyed preventive measure is called contents encryption, and enciphers contents combining the three enciphering keys a "master key", a "disk key", and a "title key."In that case, the above "disk key" and a "title key" are embedded to the field of DVD which cannot be read via logic file systems, such as a personal computer (it is hereafter called a personal computer for short), with contents.
[0008]The second preventive measure is the reproduction restrictions by a regional code. This is realized by embedding the regional code of the area which sold the DVD device at the circuit and firmware of a DVD device.
[0009]The third preventive measure is APSs (analog protection system).This APS is for performing the copy restrictions to analog VTR (video tape recorder) etc.
It is incorporated and used for the output circuit of the television video signal by hardware.

[0010]The fourth preventive measure is anti-copying policies by bus attestation.
It is treatment technique peculiar to the DVD device carried in the personal computer etc.
In this bus attestation, it checks whether the partner has received the CSS license with the DVD device and the CSS module (or DVD decryption board), and it is made not to perform data transfer until it turns out that the partner has received the CSS license. In that case, the DVD device and the CSS module are sharing the enciphered key data which changes each time "bus key (Bus Key)."And in transmitting the above "disk key" and a "title key" to a CSS module from the above-mentioned DVD device. tapping of a "disk key" and a "title key" is prevented by transmitting, after enciphering by a "bus key" ("it is a prospect to" the illegal-copy-prevention art which grasps the key to software decoding.) Nikkei BP, the Nikkei electronics, 1997.8.18(No.696)pp.110-pp.120.
[0011]There is art which inserts digital watermarking in the audio, the picture, the image, or multimedia data indicated by JP,9-191394,A as prevention art of the 3rd illegal copy. According to the gazette, the sequence of the picture, the audio signal, or the image was preferably decomposed by spectrum frequency resolution, and digital watermarking is realized by embedding an identifier peculiar in an important ingredient perceptually [a decomposition portion].
[0012]In one side, the art of specifying the root of animals and plants from DNA (deoxyribonucleic acid: one of the genetic materials) of animals and plants is known. For example, following parents to "the Kodansha blue back [Takao Kuriyama work / "or / what is known by DNA /"], and 1995" one after another from DNA, and specifying the eve which is human beings' root as them is indicated. The artificial generation method of the decussation and mutation about heredity is indicated to "the Melanie Mitchell work "method of genetic algorithm" TOKYO ELECTRIC university, 1997", etc.
[0013]
[Problem(s) to be Solved by the Invention]However, there are the following problems in the prevention art of the above-mentioned conventional illegal copy. That is, in the prevention art of the above 1st and the 2nd illegal copy, there is a problem of the thing aiming at prevention of an illegal copy that an illegal copy may be indefinitely performed once an illegal-copy-prevention measure is broken, first. A chief aim is placed by preventing an illegal copy, and when an illegal copy is performed, there is also a problem that it cannot be traced where the source of release of an illegal copy is. Although embedded to the field which cannot read the information concerning anti-copying via logic file systems, such as a personal computer, For example, there is a problem that it is also possible to read if ICE (incircuit emulator), a logic analyzer, etc. of a microprocessor are used, and prevention of the illegal copy to those who have a know how is not thoroughgoing.
[0014]in the prevention art of the illegal copy of the above 1st, since one CCI is assigned to one contents and is in them, there is a problem that tolerance is completely low, to the partial illegal copy in one contents. In the prevention art of the illegal copy of the above 1st, the method of mounting the algorithm of an illegal copy as hardware is going to be taken. However, a logic analyzer can be applied to the parallel interface which connects between LSI for code release (large scale integration circuit), and LSI for decryption, such as an image, also in this case, for example, and the data stream after code release can be taken. Or if an image capture board is connected to the dedicated bus for image transmission which connects decryption LSI and graphics accelerator LSI, there is a problem that it can copy illegally easily.
[0015]On the other hand, in the prevention art of the illegal copy of the above 3rd, there is a problem that the illegal copy of what can lower the quality of the contents copied illegally extremely itself cannot be forbidden. As well as the case of the prevention art of the above 1st and the 2nd illegal copy when an illegal copy is performed, there is a problem that the information concerning the source of release cannot be acquired.

[0016]By the way, the above-mentioned DNA is one of the information effective in specifying parents and the root of animals and plants. However, about the art of using information like DNA as circulation of contents, or information on copy management, it is not yet opened to the public.
[0017]Then, the purpose of this invention forbids an illegal copy, and when an illegal copy is performed, there is in providing the contents distribution management device which can trace that source of release, and the program recording medium with which the contents distribution management program was recorded.
[0018]
[Means for Solving the Problem]In order to attain the above-mentioned purpose, a contents distribution management device of the 1st invention, A memory measure which memorizes information in connection with distribution management of contents or contents, Are the information showing the history of information and a copy subject who express the history of the above-mentioned contents as a copy control means to control copy execution of the above-mentioned contents, and contents distribution management information which can function as copied history information is generated, It is characterized by having a contents distribution management information recording device recorded on a copy object field of both contents of a copied material and a copy destination.
[0019]According to the above-mentioned composition, if a copy of contents is permitted by a copy control means, contents distribution management information will be generated by contents distribution management information recording device, and it will be recorded on a copy object field of the above-mentioned contents. Therefore, it becomes possible to pursue a history of a copy and to specify a copy subject based on contents distribution management information currently recorded on contents copied unjustly or its copy object field. In this way, a source of release of an illegal copy can be traced.
[0020]As for the above-mentioned contents distribution management information recording device in the 1st above-mentioned invention, it is desirable to multiplex and record the above-mentioned contents distribution management information.
[0021]According to the above-mentioned composition, it becomes possible to multiplex information showing the history of the above-mentioned contents, and information showing the above-mentioned copy subject's history, and to consider it as one contents distribution management information. Therefore, relation between the above-mentioned contents and a copy subject is solved by analyzing the above-mentioned contents distribution management information.
[0022]The 1st above-mentioned invention to the above-mentioned contents distribution management information recording device. A selecting means which chooses and reads single information from contents distribution management information currently multiplexed and recorded on a copy object field of the above-mentioned contents in the case of copy execution, It is desirable to have a merging means which generates the multiplexed new contents distribution management information based on information on one layer chosen [above-mentioned] and information showing the history of a copy subject who performs a copy.
[0023]According to the above-mentioned composition, information showing the history of the above-mentioned contents and information showing the above-mentioned copy subject's history multiplex, and one contents distribution management information is generated. Therefore, it is easily solved by analyzing the above-mentioned contents distribution management information whether which contents were copied by which copy subject.
[0024]that time -- the above -- newly generated contents distribution management information has the same amount of information as contents distribution management information of origin currently recorded on a copy object field of the above-mentioned contents. Therefore, even if copy operation is repeated, the above-mentioned amount of information is kept constant, and hysteresis information of a copy does not

increase.
[0025]The 1st above-mentioned invention is provided with a decussation means to perform decussation which exchanges a part of information between information which accomplishes a pair which constitutes contents distribution management information generated by the above-mentioned merging means, As for the above-mentioned contents distribution management information recording device, it is desirable to record contents managing distribution information which it crossed [above-mentioned].
[0026]It is exchanged in a part of information between information which accomplishes a pair whenever according to the above-mentioned composition the above-mentioned contents are copied and contents distribution management information is generated. As a result, information which expresses the history of a copy subject concerning a copy till the present is inserted in either of the information which accomplishes a pair which constitutes the above-mentioned contents distribution management information.
[0027]As for the above-mentioned decussation means in the 1st above-mentioned invention, it is desirable to control a position of decussation between information which accomplishes the above-mentioned pair, width of decussation, and occurrence frequency of decussation based on a decussation function set up beforehand.
[0028]According to the above-mentioned composition, a position of the above-mentioned decussation, width of decussation, and occurrence frequency of decussation are controlled so that it is inserted in the above-mentioned contents distribution management information, without losing information which expresses the history of all the copy subjects concerning a copy till the present and the contents become ambiguous.
[0029]The 1st above-mentioned invention is provided with a mutation means to which a part of contents distribution management information generated [above-mentioned] is mutated, and, as for the above-mentioned contents distribution management information recording device, it is desirable to record contents managing distribution information which it varied [above-mentioned].
[0030]According to the above-mentioned composition, the contents of the above-mentioned contents distribution management information are prevented from the disturbance of the contents of the above-mentioned contents distribution management information being carried out, and leaking outside.
[0031]As for the above-mentioned mutation means in the 1st above-mentioned invention, it is desirable to control a position of the above-mentioned variation, the range of variation, and occurrence frequency of variation based on a mutation function set up beforehand.
[0032]According to the above-mentioned composition, a position of the above-mentioned variation, the range of variation, and occurrence frequency of variation are controlled so that the disturbance of the contents of the above-mentioned contents distribution management information is carried out more effectively.
[0033]As for a copy object field of the above-mentioned contents in the 1st above-mentioned invention, it is desirable that it is a unit relevant to structure of the contents concerned.
[0034]According to the above-mentioned composition, the above-mentioned contents distribution management information is recorded in a unit relevant to structure of contents. Therefore, an effect is demonstrated also to a partial illegal copy of contents.
[0035]The 1st above-mentioned invention is provided with an encoding means which enciphers contents distribution management information generated [above-mentioned], and, as for the above-mentioned contents distribution management information recording device, it is desirable to record contents managing distribution information enciphered [above-mentioned].
[0036]According to the above-mentioned composition, the contents of the above-mentioned contents distribution management information are effectively prevented from disturbance and being concealed and

leaking outside for the contents of the above-mentioned contents distribution management information.
[0037]The 1st above-mentioned invention is provided with an electronic-watermark-information creating means which generates electronic watermark information based on contents distribution management information enciphered [above-mentioned], and, as for the above-mentioned contents distribution management information recording device, it is desirable to record the above-mentioned electronic watermark information.
[0038]According to the above-mentioned composition, the contents of the above-mentioned contents distribution management information are prevented still more effectively [disturbance and that it is concealed and the contents of the above-mentioned contents distribution management information leak outside] completely.
[0039]As for the 1st above-mentioned invention, it is desirable to have a copied history tracking means which pursues a history of a copy and specifies a copy subject based on contents distribution management information currently recorded on a copy object field of the above-mentioned contents.
[0040]According to the above-mentioned composition, based on contents distribution management information currently recorded on contents copied unjustly or its copy object field, a history of a copy is pursued by copied history tracking means, and a copy subject is specified by it. In this way, a source of release of an illegal copy is traced easily.
[0041]A decoding means which decrypts contents distribution management information by which the 1st above-mentioned invention is recorded on a copy object field of the above-mentioned contents, It is desirable to have a copied history tracking means which pursues a history of a copy and specifies a copy subject based on contents distribution management information decrypted [above-mentioned].
[0042]According to the above-mentioned composition, even if contents distribution management information currently recorded on contents copied unjustly or its copy object field is enciphered, a history of a copy is pursued by copied history tracking means, and a copy subject is specified by it.
[0043]In a specific region which cannot be read in a logic instruction in the above-mentioned memory measure, the 1st above-mentioned invention. Memorize copy limit information including a copy subject's information that a copy was permitted for every contents, and the above-mentioned copy control means, Only when it is the copy subject by whom a demand copy subject is registered into the above-mentioned copy limit information with reference to the above-mentioned copy limit information before performing a copy, the above-mentioned contents distribution management information recording device is ordered generation of the above-mentioned contents distribution management information, As for the above-mentioned contents distribution management information recording device, it is desirable to generate the above-mentioned contents distribution management information based on the above-mentioned instructions.
[0044]According to the above-mentioned composition, by the above-mentioned copy control means, when a copy subject who has advanced a copy demand is a copy subject for copy permission, a copy is permitted. In this way, an illegal copy from a copy subject who is not a candidate for copy permission is prevented. Since the above-mentioned copy limit information is memorized in a specific region which cannot be read in a logic instruction, it cannot be read and altered with the usual copy command.
[0045]As for the above-mentioned copy control means in the 1st above-mentioned invention, when the above-mentioned demand copy subject is a copy subject who is not registered into the above-mentioned copy limit information, it is desirable to forbid execution of a copy or to display a copy prohibition message.
[0046]According to the above-mentioned composition, by the above-mentioned copy control means, when a copy subject who has advanced a copy demand is a copy subject who is not a candidate for copy permission, execution of a copy is forbidden. In this way, an illegal copy from a copy subject to whom a

copy is not permitted is prevented.
[0047]An information storing means which stores copy limit information which includes a copy subject's information that a copy was permitted, for every contents in a specific region where the program recording medium of the 2nd invention cannot read a computer by a logic instruction in a memory measure, A contents distribution management information creating means which generates contents distribution management information which is information showing the history of information and a copy subject showing the history of contents, and can function as copied history information, A decussation means to perform decussation which exchanges a part of information between information which accomplishes a pair which constitutes contents distribution management information generated [above-mentioned], A mutation means to which a part of contents distribution management information generated [above-mentioned] is mutated, An encoding means which enciphers contents distribution management information generated [above-mentioned], An electronic-watermark-information creating means which carries out electronic-watermark-information generation based on contents distribution management information enciphered [above-mentioned], and is recorded on a copy object field of both contents of a copied material and a copy destination, A decoding means which decrypts contents distribution management information currently recorded on the above-mentioned contents, and a copied history tracking means which pursues a history of a copy and specifies a copy subject based on contents distribution management information decrypted [above-mentioned], Only when a demand copy subject is a copy subject registered into the above-mentioned copy limit information, it is characterized by recording a contents distribution management processing program and a copied history tracking processing program which perform a copy of the above-mentioned contents and which are operated as a copy control means.
[0048]Information showing the history of a copy subject concerning [whenever according to the above-mentioned composition the above-mentioned contents were copied and contents distribution management information was generated / till the present] a copy is inserted in the above-mentioned contents distribution management information. Therefore, based on contents distribution management information currently recorded on contents copied unjustly or its copy object field, a history of a copy is pursued and a copy subject is specified. In this way, a source of release of an illegal copy is traced easily. The contents of the above-mentioned contents distribution management information are effectively prevented from disturbance and being concealed and leaking outside for the contents of the above-mentioned contents distribution management information.An illegal copy in case a copy subject who has advanced a copy demand is a copy subject who is not a candidate for copy permission is prevented.
[0049]
[Embodiment of the Invention]Hereafter, the embodiment of a graphic display of this invention explains in detail. Drawing 1 is a block diagram in the contents distribution management device of this embodiment. Contents, contents distribution management information, and copy limit information are accumulated in the memory measure 1. This memory measure 1 Magnetic memories, such as FD (floppy disk), CD-R (recordable compact disk), MOD (magneto-optics disk), DVD, and a hard disk, Or it realizes by semiconductor memory, such as RAM (random access memory), a smart card, and a flash memory, etc.
[0050]The copy control means 2 controls judgment of copy propriety and copy execution of the above-mentioned contents. The contents distribution management information recording device 3 reads the contents distribution management information of the copy device 4 which is a subject who copies contents or contents, New contents distribution management information is generated using the selecting means, the merging means, the decussation means, mutation means, and encoding means which are explained in full detail behind. And it writes in both the contents of a copied material and a copy destination via the copy control means 2, and the contents of a copy destination are sent out to the copy device 4. The contents distribution management information itself and the contents distribution management information

of the copy device 4 which were generated are recorded and accumulated at the memory measure 1.A copied history is pursued based on the contents distribution management information written in the copied contents. The copy device 4 gives the copy demand of some contents or contents to the copy control means 2, and copies the contents demanded based on control of the copy control means 2.
[0051]The above-mentioned copy control means 2 and the contents distribution management information recording device 3 can be realized by LSI for exclusive use or CPU (central processing unit). The copy device 4 is realized by LSI in which copy execution is possible, CPU, a personal computer, the terminal unit, etc. The copy device 4 may be contained in the inside of this contents distribution management device, and even if constituted from a device other than this contents distribution management device, it does not interfere. Or the memory measure 1 except the copy device 4, the copy control means 2, and the contents distribution management information recording device 3 can also use CPU of other devices, etc.
[0052]Drawing 2 shows the internal structure of the contents distribution management information recording device 3 which is the feature of this invention. The contents distribution management information recording device 3 comprises the selecting means 5, the merging means 6, the decussation means 7, the mutation means 8, the encoding means 9, the decoding means 11, and the copied history tracking means 12.
[0053]The above-mentioned selecting means 5 is changed into single information by choosing one side of the contents distribution management information doubled with this contents distribution management device or the copy device 4. In this embodiment, although it is explained that the above-mentioned contents distribution management information is doubled information, even if it is a case where it multiplexes more than a duplex, it is applicable.
[0054]The above-mentioned merging means 6 unites the contents distribution management information of the copy device 4 selected by the above-mentioned selecting means 5, and the contents distribution management information of the contents used as a copy object. And the doubled new contents distribution management information is generated. Between the contents distribution management information doubled by the merging means 6, the decussation means 7 exchanges a part of mutual information. The mutation means 8 reverses some of values or all values of the above-mentioned contents distribution management information. In this embodiment, since it is inherited leaving the history of the copy into the memory measure 1 contents distribution management information remembered contents or contents to be, there is contents DNA or a case where it is only called DNA for short, about the thing of contents distribution management information henceforth.
[0055]The above-mentioned encoding means 9 is a stage of the input of contents distribution management information, or an output over the above-mentioned selecting means 5, the merging means 6, the decussation means 7, or the mutation means 8, and enciphers to contents distribution management information (contents DNA). The above-mentioned encryption is good in a multiple-times line about each above-mentioned means 5-8. The kind of the above-mentioned encryption is not an object of this invention. It has the electronic-watermark-information creating means 10, and electronic watermark information is generated based on enciphered contents DNA.
[0056]The above-mentioned decoding means 11 decrypts contents DNA which was enciphered by the above-mentioned encoding means 9, and was electronic-watermark-information-ized by the electronic-watermark-information creating means 10. Based on decrypted contents DNA, contents have been copied in what kind of order, or the subject of a copy is whom or the copied history tracking means 12 pursues the copied history of **. This processing is explained in full detail behind.
[0057]Drawing 3 shows the above-mentioned contents DNA and an example of the encryption. Drawing 3 (a) is an example of contents DNA, and is a symbol string showing the history or ID (identifier) of contents or the copy device 4. Although drawing 3 (a) shows the example at the time of using the ID

number of contents or the copy device 4 as the above-mentioned symbol string, even if it is a specific sign, a specific keyword, etc., without being caught by a number, it does not interfere at all.
[0058]Drawing 3 (b) shows the result of having enciphered contents DNA shown in drawing 3 (a) by the above-mentioned encoding means 9. This encryption is performed using the key generated based on the specific function which the encoding means 9 holds. However, in drawing 3 (b), it is changing and displaying on the character string by 8 bitwises so that the obtained code can be viewed. Drawing 3 (c) starts the portion of the beginning of the character string shown in drawing 3 (b), in order to simplify future explanation. Henceforth, it explains as a thing representing the whole information showing contents DNA enciphered in the character string of drawing 3 (c). The character string of explanation which changed the above-mentioned code by 8 bitwises for convenience is treated as a contents DNA. Drawing 3 (d) shows that contents DNA of drawing 3 (c) doubles and is saved.
[0059]Drawing 4 shows changes of contents DNA in fusion by the above-mentioned merging means 6, the decussation by the decussation means 7, and the mutation by the mutation means 8. Drawing 4 (a) shows doubled contents DNA. Here, 21 is contents DNA by the side of contents. 22 is contents DNA by the side of the copy device 4 generated like contents DNA21. the case of drawing 4 (a) -- the contents side and a copy device -- each contents DNA expresses the state where the only same information is accumulated doubly, 4 side.
[0060]Drawing 4 (b) is chosen by the above-mentioned selecting means 5, and either of contents DNA21 by the side of the doubled contents and either of contents DNA22 by the side of the doubled copy device 4 by the merging means 6. The state where new contents DNA doubled by contents DNA23 by the side of the contents chosen [above-mentioned] and contents DNA24 by the side of the copy device 4 was generated is shown.
[0061]Drawing 4 (c) shows the state where decussation was performed by the decussation means 7, to between new contents DNAs generated by the above-mentioned merging means 6. Decussation in this case is performed by replacing five characters from the mutual left end in contents DNA23 by the side of the contents shown in drawing 4 (b), and contents DNA24 by the side of the copy device 4. Henceforth, it is referred to as "Crossing" to replace partial character strings in this way. That is, that to which five characters intersected five characters from the left end of contents DNA24 from the left end of contents DNA23 is contents DNA25, and that to which five characters intersected five characters from the left end of contents DNA23 from the left end of contents DNA24 conversely is contents DNA26.
[0062]Drawing 4 (d) shows the state where mutation was performed by the above-mentioned mutation means 8. The mutation in this case is a case where a part of information on contents DNA25 shown in drawing 4 (c) changed suddenly, and is set to contents DNA27. In this case, the partial information "character string ZZ" Becoming is changing to the information "character string ZY" Becoming.
[0063]Drawing 5 is a key map showing the state where the above-mentioned decussation was performed to the above-mentioned contents DNA. Although the kinds of the above-mentioned decussation include one-point decussation, two-point decussation, uniform decussation, etc., the kind in particular of decussation is not asked in this embodiment. In the case of two-point decussation, in this embodiment, it explains as an example. "Decussation" is performed when the information on some fields of a certain contents DNA replaces the information on a field that contents DNA which is a pair corresponds.
[0064]In drawing 5, 31 shows contents DNA after decussation was performed. And the information 32 and the information 34 in contents DNA31 are information on the original contents DNA. The information 33 which gave the slash is information replaced from contents DNA which is a pair by decussation.
[0065]The above-mentioned information 33 here probability p_c which has the width of l_1 in the position of l_0 and intersects it from the left end of contents DNA31, Probability that the decussation itself will occur is made into p_o, and probability that decussation information has width l_1 is made into p_w, and if decussation

makes p_l probability generated in the position of l_0 from a left end, it can express with "$p_c=p_o*p_w*p_l$."Similarly, the above-mentioned mutation is also generated in probability p_m. Probability p_c and p_m which decussation and mutation generate are set up by the probability generator in the decussation means 7 and the mutation means 8, respectively.

[0066]Drawing 6 is a flow chart of the contents distribution management information recording processing operation performed by the above-mentioned contents distribution management information recording device 3 under control of the above-mentioned copy control means 2. Hereafter, according to drawing 6, contents distribution management information recording processing is explained.

[0067]At Step S1, it is distinguished by the above-mentioned copy control means 2 whether there is any copy demand from the copy device 4. And if there is a copy demand, it will progress to Step S2. Here, although it may be carried out to some of cases where the above-mentioned copy demand is given to the whole contents, and contents, in order to explain simply, explain the case where it carries out to the whole contents to an example. About the case where a copy demand is performed to some contents, it explains supplementarily behind.

[0068]Collation of contents DNA is performed by the above-mentioned copy control means 2 at Step S2. Contents DNA compared is contents DNA of the both sides from the copy device 4 side which sent out the copy demand the contents side. Contents DNA by the side of contents is written in contents in form as shown in drawing 3 (d), and is memorized by the memory measure 1. [at least] On the other hand, contents DNA by the side of the copy device 4 does not necessarily interfere, even if information is information on form as not multiplexed, for example, shown in drawing 3 (a) or drawing 3 (b).

[0069]The propriety of a copy is distinguished based on the copy condition of compatibility read from contents or the memory measure 1 to contents DNA written in and accumulated in the contents side by the above-mentioned copy control means 2 at Step S3, and contents DNA by the side of the copy device 4. And when a copy is good, it progresses to step S4, and in being copy no, it progresses to Step S13. Distinction of this copy propriety is described separately.

[0070]By step S4, according to the copy permission command from the above-mentioned copy control means 2, one is chosen by the selecting means 5 of the contents distribution management information recording device 3 from contents DNAs by the side of the multiplexed contents, and contents DNA is one layer-ized. Each multiplexed contents DNAs are not necessarily the same information, and inside information differs as it goes the generation of a copy in piles.

[0071]Fusion processing which generates contents DNA which multiplexed contents DNA by the side of the contents one layer-ized in step S4 by the above-mentioned merging means 6 at Step S5 combining contents DNA by the side of the copy device 4 is performed.

[0072]The decussation probability parameter of contents DNA is generated by the above-mentioned decussation means 7 at Step S6. Here, as the above-mentioned decussation probability parameter, decussation probability-of-occurrence p_o mentioned above, probability p_l of a position, and width probability p_w are used. Decussation processing is performed by the decussation means 7 at Step S7. That is, the position and width of decussation are determined based on the probability parameter generated in Step S6, and decussation is performed between contents DNA by the side of the contents doubled according to probability-of-occurrence p_o (multiplexing), and contents DNA by the side of the copy device 4.

[0073]The mutation parameter of contents DNA is generated by the above-mentioned mutation means 8 at Step S8. Here, as the above-mentioned mutation parameter, probability q_n of a number besides probability-of-occurrence q_o of mutation, probability q_l of a position, and width probability q_w, etc. exist. By step S9, mutation processing is performed by the mutation means 8 based on the above-mentioned mutation parameter. It is determined as which contents DNA of contents DNA by the side of the contents

doubled on that occasion (multiplexing), and contents DNA by the side of the copy device 4 whether mutation is generated.
[0074]Contents DNA is enciphered by the above-mentioned encoding means 9 at Step S10. Here, in this embodiment, a problem is not used in particular about a cipher system. In the flow chart shown in drawing 6, encryption processing is performed only once after mutation. However, contents referred to in this invention or ID of the subject of a copy (drawing 3 (b)), It is possible to contents DNA before performing decussation processing, contents DNA after performing decussation processing, contents DNA after performing mutation processing, etc. 1 time or to carry out multiple-times execution.
[0075]Electronic watermark information is generated from contents DNA enciphered by the above-mentioned electronic-watermark-information creating means 10 in the above-mentioned step S10 at Step S11. In this case, it is also possible to constitute the method of spacing which is different according to the kind of contents so that the electronic-watermark-information creating means 10 may be expressed later selectable. Recording processing which records the electronic watermark information (contents DNA) which serves as the copied history information from the contents distribution management information recording device 3 by the copy control means 2 at Step S12 is performed. "Records of contents DNA" said here is the processing which is written in the contents of a copy destination and returned to the copy device 4, the processing added and written in the contents of the copy origin memorized by the memory measure 1, and processing saved directly at the memory measure 1.
[0076]Copy execution is prevented when it is distinguished from copy no in the above-mentioned step S3 at Step S13.
[0077]In the flow chart of the above-mentioned contents distribution management information recording processing operation, When a copy is good, encryption is performed by the encoding means 9 after one layer-izing of the information by the selecting means 5, fusion processings by the merging means 6, decussation processings by the decussation means 7, and all the mutation processings by the mutation means 8 are performed. However, the contents distribution management information recording processing operation in this embodiment is not what is limited to this, One layer-izing of information -> various contents distribution management information recording processings, such as encryption, one layer-ized -> fusion processing -> encryption of information, one layer-ized -> fusion processing -> decussation processing -> encryption of information, one layer-ized -> mutation processing -> encryption of information, and one layer-ized -> fusion processing -> mutation processing -> encryption of information, are possible.
[0078]Drawing 7 shows an example of the header information added to each contents, in order to manage contents. This header information is accumulated in the memory measure 1 with the contents added.
[0079]In drawing 7, the record which begins from "the kind m of contents" and finishes at "the term of protection m" holds the copyright information of works. Among these, the record 59 is the copyright information about original works, and the records 60 and 61 are the copyright information about secondary works. The records 41, 47, and 53 are the information showing "content ID m."The ID number for identifying contents is registered into this record. The above-mentioned ID number may be the identifier which combined the serial order of the row of the number of the media concerned, and content ID. In that case, since it can determine in order of a row, content ID may be omitted.
[0080]The records 42, 48, and 54 express "the kind (contents type) m of contents."For the contents protected under copyright in this embodiment, in the kind of contents. The works of a novel, a scenario, a paper, a lecture and other linguistic works, and music, There are a dance or the works of a pantomime, pictures, a print, sculpture and the works of other fine arts, the works of construction, a map, the drawing that has scientific character, a chart, a model and works of other figures, works of a movie, works of a photograph, works of a program, etc. Although the kind of these contents may differ in an object for a

while by the country where contents were produced, or the country consumed, there is no change in the essence of an invention.
[0081]The records 43-45, the records 49-51, and the records 55-57 express the "author" corresponding to the kinds 42, 48, and 54 of contents, respectively. For an author, the number is decided by a common author's existence. For example, for p person and the common authors 49-51 of the secondary works 60, the common author of original works of q person and the common authors 55-57 of the secondary works 61 is r person. An author's records 43-45, 49-51 and the information registered into 55-57 can specify an author, and has some (assumed name) which replace with a name, a name (real name) or its pseudonym, a pen name, an abbreviation, and other real names, for example, are used. Or it may be an ID code which can specify the combination of these and other attributes, such as an address and an occupation, or these authors. An author changes also with the kinds of contents. For example, when the kind of contents is a movie, as an author, it takes charge of work, a supervisor, production, photography, fine arts, music, etc., and what contributed to overall formation of the works about the movie creatively corresponds. When the kind of contents is music, an author deserves a composer, a songwriter, an arrangement house, a player, a singer, etc., and in being a novel, an author deserves a writer, a translator, a sentence painter, etc.
[0082]The records 46, 52, and 58 are the information showing the "contents term of protection m" corresponding to the content ID 41, 47, and 53, and the final day of the shelf-life is usually registered.
[0083]Here, the unit and structure of contents change with the above-mentioned content ID and kinds of contents. For example, when the kinds of contents are linguistic works (it may be henceforth called a document or a document), there are structures other than content ID which show the whole document, such as a table of contents, a chapter, a paragraph, a page, an index, a paragraph, a line, and a character. A copy demand at the above-mentioned step S1 in the contents distribution management information recording processing operation shown in drawing 6 is given to one unit or two or more units by making the above-mentioned structure into a unit. Therefore, the demand of a field copy is also attained like ["from the 5th paragraph to the 8th paragraph of Chapter 1"] by specifying the above-mentioned unit other than a copy demand to the whole contents as a copy demand from the copy device 4. [in the contents whose content ID is "n", for example]
[0084]Next, in the above-mentioned step S11 in the contents distribution management information recording processing operation shown in drawing 6, the electronic-watermark-information generation processing performed by the above-mentioned electronic-watermark-information creating means 10 is explained in detail. Drawing 8 is a flow chart of electronic-watermark-information generation processing operation. In the above-mentioned step S10 in the flow chart of drawing 6, an end of encryption processing will start electronic-watermark-information generation processing operation.
[0085]At Step S21, the copy object of the copy demanded from the above-mentioned copy device 4 is referred to. At Step S22, the range of a copy demanded from the copy device 4 is referred to. At Step S23, the contents type (kind of contents) of the copy object demanded from the copy device 4 is referred to. These references are performed to the header information of each contents stored in the memory measure 1. And concrete information (contents) is acquired as a result of above reference.
[0086]At Step S24, it is distinguished whether the kind of the reference result in the above-mentioned step S21 - Step S23 and contents is an "image."As a result, if it is an image, it will progress to Step S25, otherwise, will progress to Step S28. It is distinguished at Step S25 whether the kind of contents is a "still picture." As a result, if it is a still picture, it will progress to Step S26, otherwise, will progress to Step S27. The still picture watermark method is chosen at Step S26. To such the back, it goes at Step S33. Here, a concentration-patterns method, systematic dithering method, an error diffusion method, etc. exist in the still picture watermark method. And when image data has shade information, how to space various kinds, such as pixel substitution, pixel space use, quantization error use, frequency domain use, and

statistics value use, is known. In this embodiment, specification in particular is not carried out about the still picture watermark method. The animation watermark method is chosen at Step S27. To such the back, it goes at Step S33. Here, the method of spacing according to standards, such as MPEG(moving picture extract part group) 1, MPEG 2, and MPEG4, is known by the "animation watermark method."In this embodiment, specification in particular is not carried out about the animation watermark method.
[0087]It is distinguished at Step S28 whether the kind of contents is a "sound."As a result, if it is a sound, it will progress to Step S29, otherwise, will progress to Step S30. The voice watermark method is chosen at Step S29. Such the back progresses to Step S33. Here, the method of analog format, voice quantization, aural masking, a prediction numerals run length, vector quantization, a sound source pulse, etc. spacing through the "voice watermark method" is known. In this embodiment, specification in particular is not carried out about the voice watermark method.
[0088]It is distinguished at Step S30 whether the kind of contents is a "document."As a result, if it is a document, it will progress to Step S31, otherwise, will progress to Step S32. The document watermark method is chosen at Step S31. To such the back, it goes at Step S33. Here, the method of spacing through the "document watermark method" in European languages or Japanese, and changing the generation technique is known. At Step S32, the method of spacing according to other "kinds of contents" is chosen. Like ****, in this embodiment, a problem is not used about the digital-watermarking method, but at least one digital-watermarking method should just be chosen according to the kind of contents.
[0089]It is distinguished whether electronic watermark information is generable by the method selected at Step S33 as mentioned above of spacing. As a result, if generation is possible, it will progress to Step S36, and if generation is impossible, it will progress to Step S34. Here, the electronic watermark information written in a copy object in this embodiment is contents DNA which has specified length. Therefore, since a copy unit (getting it blocked the range of a copy object) cannot write in the electronic watermark information acquired when small enough compared with contents DNA, it judges with generation of electronic watermark information being impossible. In a watermark information writing area, it is distinguished at Step S34 whether it is the maximum. As a result, if it is the maximum, a return will be carried out to the above-mentioned step S13 in the above-mentioned contents distribution management information recording processing operation, and the copy concerned will be refused. On the other hand, if it is not the maximum, it will progress to Step S35. Here, the maximum of the above-mentioned watermark information writing area is the whole contents of the content ID which is a copy object.
[0090]At Step S35, the above-mentioned electronic-watermark-information writing area is expanded to the field (large one unit) on one rank rather than the present field. Here, the initial value of an electronic-watermark-information writing area is the copy range (unit) obtained as a result of the reference in the above-mentioned step S22. Such the back returns to the above-mentioned step S23, and selection of the digital-watermarking method is performed again. And if it judges that electronic watermark information is [generation] possible in the above-mentioned step S33, it will progress to Step S36.
[0091]At Step S36, a digital-watermarking writing area is determined based on the present watermark information writing area. At Step S37, the electronic watermark information of contents DNA is generated by the digital-watermarking method chosen [above-mentioned]. In such the back, a return is carried out to the above-mentioned step S12 in the above-mentioned contents distribution management information recording processing operation, and recording processing is performed. As a result, the electronic watermark information of contents DNA generated in the above-mentioned step S37 is written in the digital-watermarking writing area determined in the above-mentioned step S36 in both the contents of a copied material and a copy destination. And the contents of the copy destination where this contents DNA (electronic watermark information) was written in are returned to the copy device 4.
[0092]Next, the processing which pursues a copied history is explained based on contents DNA

(electronic watermark information) written in contents as mentioned above. Drawing 9 shows changes of contents DNA when one contents are copied one by one. 65 in drawing 9 is contents DNA of the original copy (the 1st generation) in contents. Similarly, 66 is original contents DNA in copy device A, 67 is original contents DNA in copy device B, and 68 is original contents DNA in copy device C.
[0093]The merging means's 6 fusion of original content DNA by the side of contents and original content DNA of copy device A will generate contents DNA69 of the second generation. A figure shows that original content DNA of each origin has accomplished the pair. Contents DNA70 will be generated if decussation is performed by the decussation means 7 to this contents DNA pair. Into the information which is the target of the above-mentioned decussation, ****** also includes and explains to decussation that by which a part of information was changed by the above-mentioned mutation henceforth.
[0094]Next, if fusion is performed between second generation contents DNA70 after the above-mentioned decussation, and original content DNA67 of copy device B, contents DNA71 of the third generation will be generated. And contents DNA72 will be generated if decussation is performed to the contents DNA pair of contents DNA71. Similarly, if fusion is performed between third generation contents DNA72 after decussation, and original content DNA68 of copy device C, contents DNA73 of the fourth generation will be generated. And contents DNA74 will be generated if decussation is performed to the contents DNA pair of contents DNA73.
[0095]Saying "a copied history is pursued" in this embodiment. Contents DNA74 of the fourth generation after decussation being given, and following changes of contents DNA73 of the fourth generation before decussation, contents DNAs 72 and 71 of the third generation decussation back to front, contents DNAs 70 and 69 of the second generation decussation back to front, and contents DNA. It is clarifying the copy devices A-C (original content DNAs 66-68) which participated in the copy.
[0096]Drawing 10 is a flow chart of the copied history tracking processing operation performed by the contents distribution management information recording device 3 under control of the above-mentioned copy control means 2. Hereafter, copied history tracking processing is explained according to drawing 10. Contents DNA which becomes the origin of the pursuit in that case should be generated in order of the copy in drawing 9.
[0097]The contents DNA74 [newest] is extracted out of contents DNA written in and accumulated in the contents or the memory measure 1 which is the target of pursuit by the above-mentioned copy control means 2 at Step S41. Here, the selection of the newest contents DNA should just choose contents DNA with the most complicated both sides of contents DNA that accomplish a pair. What is necessary is just to create the index of the order of a copy, and the writing address of contents DNA, when accumulating contents DNA in contents in order to accelerate extraction of the newest contents DNA.
[0098]The contents DNA74 [newest] extracted in the above-mentioned step S41 at Step S42 by the decoding means 11 in the above-mentioned contents distribution management information recording device 3 is decrypted. The difference of the contents DNA74 [newest] and original content DNAs 66-68 of each copy device A-C which were decrypted by the above-mentioned copied history tracking means 12 in the above-mentioned step S42 at Step S43 is called for. Original content DNAs 66-68 of each copy devices A-C are stored and saved at the memory measure 1, when a copy is performed in the past. Original content DNA which presents the minimum difference at Step S44 is calculated. In this example, when original content DNA68 of copy device C is compared with contents DNA74b [on the other hand / (in drawing 9, it is the bottom)] in latest-contents DNA74, it becomes with the minimum difference.
[0099]The preliminary decision of the copy device C of original content DNA68 which presents the minimum above-mentioned difference at Step S45 is carried out as a copy subject. At Step S46, the difference of original content DNA68 of a copy subject by which the preliminary decision was carried out [above-mentioned], and above-mentioned one contents DNA74b of latest-contents DNA74 which

presents the above-mentioned minimum difference is taken. As a result, in this example, the lower 1st slash field 75 and the 2nd slash field 76 in contents DNA74b are extracted.
[0100]The compensation process which replaces the information on the fields 75 and 76 extracted in the above-mentioned step S46 at Step S47 with the information on the field 77 in a pair of contents DNA74a (above) that it corresponds is performed. As a result, it is returned to contents DNA73 before contents DNA74 after the decussation which is latest-contents DNA crossing. In that case, bit flipping is carried out so that the degree of match of lower contents DNA73b and original content DNA68 of a copy subject in contents DNA73 before the obtained decussation may become the maximum, and the data modification produced in mutation is also amended. It is distinguished whether contents DNA73b before the decussation obtained at Step S48 as a result of the amendment in the above-mentioned step S47 is in agreement with original content DNA68 of a copy subject. As a result, if, and it progresses to Step S49 and is not in agreement with it, it returns to the above-mentioned step S47, and amendment of the above-mentioned mutation, etc. are continued.
[0101]Contents DNA73 before the decussation obtained as mentioned above at Step S49 as a result of amendment is determined as a contents DNA of present cost. Copy device C which has original content DNA68 of the same contents as contents DNA73b of the bottom in contents DNA73 of the present cost determined [above-mentioned] at Step S50 is specified as it is the copy device which participated in generation of contents DNA73 of present cost. At Step S51, contents DNA concerning a previous generation's contents is calculated from contents DNA73a of the upper part in contents DNA73 of present cost.
[0102]it is distinguished whether contents DNA73a concerning a previous generation's contents 73 called for in the above-mentioned step S51 at Step S52 is original content DNA (getting it blocked -- the contents of the 1st generation -- do DNA or not?). As a result, if it is original content DNA, copied history tracking processing operation will be ended. On the other hand, if it is not original content DNA, it will progress to Step S53.
[0103]Previous generation contents DNA72 which has a previous generation's contents DNA73a called for in the above-mentioned step S51 is searched with Step S53 from all the contents DNAs accumulated in the contents concerned, or the above-mentioned index. At Step S54, it is distinguished as a result of the search in the above-mentioned step S53 whether applicable previous generation contents DNA was in the DNA information of the contents concerned. As a result, in being, it returns to the above-mentioned step S43, and shifts to the history tracking processing about a previous generation further. On the other hand, when there is nothing, it progresses to Step S55. In shifting to the history tracking processing about a previous generation further here, it applies "contents DNA72" to "the contents DNA74 [newest]" in the above-mentioned step S43 and the above-mentioned step S46. And if contents DNA which starts a previous generation's contents in the above-mentioned step S52 is distinguished as it is original content DNA, it will end copied history tracking processing operation. At Step S55, the back copied history tracking processing operation to which the error display was carried out is ended.
[0104]Next, the decision processing of the copy propriety performed in the above-mentioned step S2 and Step S3 in the contents distribution management information recording processing operation shown in above-mentioned drawing 6 is explained in detail. Drawing 11 shows the data structure at the time of recording the limitation information of a copy. This copy limit information is written in the specific region which cannot be read in the usual copy command (getting it blocked logic instruction) in contents or the memory measure 1.
[0105]In drawing 11, the records 81, 88, and 89 are records which record the ID number of copy object contents. The contents of these records 81, 88, and 89 are the same as that of the content ID 41, 47, and 53 in the header information shown in drawing 7. The records 82, 84, 86, 90, and 91 are records which record

ID of the copy device with which the copy of contents was permitted. The records 83, 85, and 87 are records which record the copy restricted frequency by each copy device to the contents concerning the content ID 1. Similarly, the copy restricted frequency according [copy device ID / as opposed to the contents of "m" in content ID] to the copy device of "x" is recorded on the record 92.
[0106]That is, the copy information 93 is the copy information about the contents whose content ID is "1."Similarly, the copy information 94 and 95 is the copy information about the contents whose content ID is "2" and "m."Each above-mentioned copy information shall be enciphered by the encryption algorithm used when generating contents DNA.
[0107]Drawing 12 is a flow chart of copy propriety decision processing operation. If there is a copy demand in the above-mentioned step S1 in the contents distribution management information recording processing operation shown in above-mentioned drawing 6 and it will be distinguished, the above-mentioned copy propriety decision processing operation will start.
[0108]Specification of a demand copy device which specifies the copy device which performed the copy demand at Step S61 is performed. specification of a demand copy device is written in the above-mentioned specific region in the contents or the memory measure 1 of a copy object -- **** -- it is carried out by referring to copy limit information (drawing 11). This processing is performed before the usual copy command. At Step S62, it is judged whether specification of the demand copy device was successful. As a result, when it succeeds, the copy device which advanced the copy demand is recognized as it being a copy permission object device, and progresses to Step S63. On the other hand, a return is carried out to the above-mentioned step S13 in the above-mentioned contents distribution management information recording processing operation noting that the possibility of an illegal copy is size, when it fails.
[0109]Contents DNA saved in the copy object concerned at Step S63 based on a copy object and ID of the copy device which is the above-mentioned copy permission object device is referred to. Past history decipherment processing in which it is decoded how many times the copy device which has sent out the copy demand at Step S64 this time based on the reference result of the above-mentioned contents DNA copied the copy object concerned in the past is performed. In that case, the method of a decipherment which can be set applies to the copied history tracking processing operation shown in drawing 10.
[0110]At Step S65, the contents of the above-mentioned copy limit information (drawing 11) are referred to. The copy restricted frequency in connection with the copy device and copy object which advanced the demand by Step S66 based on the result of above reference is compared with the copied history of the above-mentioned past, and it is distinguished whether the copy frequency by this demand is below copy restricted frequency. As a result, if it is the following, a return will be carried out to the above-mentioned step S4 in the above-mentioned contents distribution management information recording processing operation, and generation of new contents DNA will be started. On the other hand, if that is not right, a return will be carried out to the above-mentioned step S13 in the above-mentioned contents distribution management information recording processing operation.
[0111]As mentioned above, the memory measure 1 which memorizes and accumulates contents and contents DNA in this embodiment,A copy control means 2 to control judgment of the copy propriety of the above-mentioned contents, pursuit of a copied history, and copy execution, Based on contents and contents DNA of the copy device 4, it has the contents distribution management information recording device 3 which writes in and records new contents DNA on the contents generated and copied.
[0112]And when the above-mentioned contents distribution management information recording device 3 generates contents DNA. One of the contents DNAs by the side of the contents doubled by the selecting means 5 is chosen, it doubles combining contents DNA by the side of the contents chosen [above-mentioned] by the merging means 6, and original content DNA by the side of the copy device 4, and new contents DNA is generated. And it crosses to the contents DNA pair in doubled new contents DNA further

by the decussation means 7 of the above-mentioned contents distribution management information recording device 3. It mutates by the mutation means 8 if needed.
[0113]On the other hand, the copy limit information which contains the copy restricted frequency by ID and the copy device of the copy device for copy permission in the specific region which cannot be read in the usual copy command (logic instruction) is written in each contents or the memory measure 1.
[0114]If a copy demand is received from the copy device 4, the above-mentioned copy control means 2 will be made to carry out copy refusal with reference to the above-mentioned copy limit information, when the demand copy device 4 is not a copy permission object device. Therefore, according to this embodiment, the illegal copy can be prevented.
[0115]On the other hand, in being a copy permission object device, it orders it pursuit of a copied history to the contents distribution management information recording device 3. So by then, the copied history tracking means 12 of the contents distribution management information recording device 3. Performing comparison with the history of contents DNA accumulated in the memory measure 1, and original content DNA of the copy device which copied to the past, the above-mentioned fusion, decussation, and the reverse procedure of mutation are followed until it is followed and attached to original content DNA of the contents concerned. As a result, original content DNA by the side of the copy device crossing by the time original content DNA of the contents concerned changed to the newest contents DNA can be extracted.
[0116]Therefore, based on the copy device and copy frequency which copied to the past obtained in this way, the contents of the above-mentioned copy limit information, and ID of the copy device which advances a demand now and is, it can be judged [which receives the copy demand which acts as Imaide / or or] whether it refuses. That is, according to this embodiment, even if the metaphor above-mentioned illegal-copy-prevention measure is broken, it can prevent being copied illegally indefinitely.
[0117]When the contents stored in the above-mentioned memory measure 1 are copied unjustly and have appeared on the market in the commercial scene, Based on the history of contents DNA written in and accumulated in inaccurate copy contents, the copy device concerning an illegal copy can be solved by pursuing an above-mentioned copied history. Therefore, the source of release of the illegal copy can be traced.
[0118]In the case of a document or a document, in this embodiment, contents DNA generated at the time of a copy can be written in by contents in the unit relevant to the structure of each contents, such as a table of contents, a chapter, a paragraph, a page, a paragraph, or a line, for example. Therefore, in the unit according to each contents, contents DNA can be embedded and tolerance becomes high also to the partial illegal copy of contents.
[0119]In this embodiment, as mentioned above, when copying contents, decussation processing and mutation processing are performed to required contents DNA. By the encoding means 9 and the electronic-watermark-information creating means 10 of the contents distribution management information recording device 3, contents DNA generated as mentioned above is enciphered and digital-watermarking computerized, and the disturbance and concealment of information are performed. Therefore, even if it reads contents unjustly using apparatus, such as the above-mentioned ICE, it is impossible to decode the contents of the contents DNA or to alter. The above-mentioned copy limit information is written in the specific region which cannot be read in the usual copy command (logic instruction) of contents or the memory measure 1. Therefore, the existence of this copy limit information itself is not clarified.
[0120]In this embodiment, the amount of information of the above-mentioned contents DNA is kept constant by operation of the selecting means 5 and the merging means 6. Therefore, even if it repeats copy operation, the amount of hysteresis information (amount of information of contents DNA) does not increase.
[0121]By the way, the function as the copy control means 2 in the above-mentioned embodiment, the

contents distribution management information recording device 3, the selecting means 5, the merging means 6, the decussation means 7, the mutation means 8, the encoding means 9, the electronic-watermark-information creating means 10, the decoding means 11, and the copied history tracking means 12, The contents distribution management information recording processing program, the electronic-watermark-information generation and the recording processing program and the copied history tracking processing program which were recorded on the program recording medium, and a copy propriety decision processing program realize.

[0122]The above-mentioned program recording media in the above-mentioned embodiment are program media which become by ROM (read only memory: not shown) provided in the different body in the above-mentioned memory measure 1. Or they may be the program media equipped with and read to external auxiliary storage (not shown). The program reading means which reads each above-mentioned processing program from the above-mentioned program media in the case of which, It may have the composition which carries out direct access to the above-mentioned program media, and is read to them, and it may download in the program store area established in RAM (not shown), and may have the composition accessed and read to the above-mentioned program store area. The download program for downloading in the program store area of the above-mentioned RAM from the above-mentioned program media shall be beforehand stored in the main frame.

[0123]With the above-mentioned program media, it is constituted disengageable the main part side here, Magnetic disks, such as a tape system of magnetic tape, a cassette tape, etc., FD, and a hard disk, CD(compact disk)-ROM, MOD, MD (mini disc), It is a medium including semiconductor memory systems, such as card systems, such as a disk system of optical discs, such as DVD, IC (integrated circuit) card, and an optical card, a mask ROM, EPROM (ultraviolet-rays elimination type ROM), EEPROM (electric elimination type ROM), and a flash ROM, which supports a program fixed.

[0124]The contents distribution management device in the above-mentioned embodiment, When it has the composition which is provided with a modem and contains the Internet and in which a communication network and connection are possible, even if the above-mentioned program media are media which support a program fluidly by download from a communication network, etc., they do not interfere. The download program for downloading from the above-mentioned communication network which can be set in that case shall be beforehand stored in the main frame. Or it shall be installed from another recording medium.

[0125]It is not limited only to a program and what is recorded on the above-mentioned recording medium can also record data.

[0126]

[Effect of the Invention]As mentioned above, so that clearly the contents distribution management device of the 1st invention, Contents DNA which is the information showing the history of the information and copy subject showing the history of contents, and can function as copied history information by a contents distribution management information recording device is generated, Since it records on the copy object field of both the contents of a copied material and a copy destination, copied history information will be recorded on the copy object field of the copied contents. Therefore, it becomes possible to pursue the history of a copy and to specify a copy subject based on contents DNA currently recorded on the contents copied unjustly or its copy object field. That is, according to this invention, the source of release of an illegal copy can be traced.

[0127]If the above-mentioned contents DNA is multiplexed and recorded by the above-mentioned contents distribution management information recording device, the 1st above-mentioned invention will multiplex the information showing the history of the above-mentioned contents, and the information showing the above-mentioned copy subject's history, and it will become possible to be referred to as one

contents DNA. Therefore, the relation between the above-mentioned contents and a copy subject can be solved by analyzing the above-mentioned contents DNA.
[0128]The selecting means which chooses single information from contents DNA which multiplexes the 1st above-mentioned invention to the above-mentioned contents to the above-mentioned contents distribution management information recording device in the case of copy execution, and is recorded, If it has a merging means which generates new contents DNA multiplexed based on the information on one layer chosen [above-mentioned], and the information showing a copy subject's history, the information showing the history of the above-mentioned contents and the information showing a copy subject's history are multiplexed, and one contents DNA can be generated. Therefore, it can be easily solved by analyzing the above-mentioned contents DNA whether which contents were copied by which copy subject.
[0129]that time -- the above -- newly generated contents DNA has the same amount of information as contents DNA of the origin currently recorded on the copy object field of the above-mentioned contents. Therefore, even if it repeats copy operation, the above-mentioned amount of information can be kept constant, and the hysteresis information of a copy can be prevented from increasing.
[0130]The 1st above-mentioned invention can generate easily contents DNA in which the information which expresses the history of the copy subject concerning a copy till the present was inserted, if a part of information is exchanged between the information which accomplishes the pair which constitutes contents DNA generated by the above-mentioned merging means by a decussation means.
[0131]If the position of decussation between the information which accomplishes the above-mentioned pair, the width of decussation, and the occurrence frequency of decussation are controlled based on the decussation function beforehand set up in the above-mentioned decussation means in the 1st above-mentioned invention, Contents DNA to which it is inserted in, without losing the information which expresses the history of all the copy subjects concerning a copy till the present, and the disturbance of the contents is carried out is generable.
[0132]The 1st above-mentioned invention can prevent the contents of the above-mentioned contents DNA from carrying out the disturbance of the contents of the above-mentioned contents DNA, and leaking outside by a mutation means, if it varies in a part of contents DNA generated [above-mentioned].
[0133]If the position of the above-mentioned variation, the range of variation, and the occurrence frequency of variation are controlled based on the mutation function beforehand set up in the above-mentioned mutation means in the 1st above-mentioned invention, the disturbance of the contents of the above-mentioned contents DNA can be carried out more effectively.
[0134]The 1st above-mentioned invention can record the above-mentioned contents DNA in the unit relevant to the structure of contents, if the copy object field of the above-mentioned contents is made into the unit relevant to the structure of the contents concerned. Therefore, tolerance over the partial illegal copy of contents can be made high.
[0135]The 1st above-mentioned invention can do the disturbance and concealment of the contents of the above-mentioned contents DNA, if contents DNA generated [above-mentioned] is enciphered by an encoding means. Therefore, the contents of the above-mentioned contents DNA can be effectively prevented from leaking outside.
[0136]In disturbance and concealment, the 1st above-mentioned invention can do the contents of the above-mentioned contents DNA more nearly thoroughly, if an electronic-watermark-information creating means generates electronic watermark information based on contents DNA enciphered [above-mentioned]. Therefore, the contents of the above-mentioned contents DNA can be prevented from leaking outside still more effectively.
[0137]If the 1st above-mentioned invention pursues the history of a copy based on the above-mentioned contents DNA currently recorded on the above-mentioned contents and specifies a copy subject by a

copied history tracking means, The history of the copy about the contents copied illegally can be pursued and the source of release of an illegal copy can be traced easily.
[0138]Based on decrypted contents DNA, the 1st above-mentioned invention by a decoding means by a copied history tracking means. If the history of a copy is pursued and a copy subject is specified, even if contents DNA currently recorded on the contents copied unjustly is enciphered, the history of a copy can be pursued and a copy subject can be specified.
[0139]Memorize the 1st above-mentioned invention to the specific region which cannot be read in the logic instruction in the above-mentioned memory measure, and copy limit information including a copy subject's information that the copy was permitted by the above-mentioned copy control means. If the above-mentioned contents distribution management information recording device is ordered generation of the above-mentioned contents DNA only when a demand copy subject is a copy subject registered into the above-mentioned copy limit information, A copy is permitted only to the copy subject for copy permission, and the illegal copy from the copy subject who is not a candidate for copy permission can be prevented. Since the above-mentioned copy limit information is memorized in the specific region which cannot be read in a logic instruction, it can prevent being read and altered with the usual copy command.
[0140]If the 1st above-mentioned invention forbids execution of a copy or it displays a copy prohibition message in being a copy subject by whom the above-mentioned demand copy subject is not registered into the above-mentioned copy limit information in the above-mentioned copy control means, The illegal copy by the copy subject who is not a candidate for copy permission can be forbidden.
[0141]The information storing means which stores the above-mentioned copy limit information in the specific region where the program recording medium of the 2nd invention cannot read a computer by the logic instruction in a memory measure, The contents distribution management information creating means which generates the above-mentioned contents DNA, A decussation means to perform the above-mentioned decussation, a mutation means to perform the above-mentioned mutation, and the encoding means that performs the above-mentioned encryption, The electronic-watermark-information creating means which generates and records the above-mentioned electronic watermark information, The decoding means which decrypts the above-mentioned contents DNA, and the copied history tracking means which pursues the history of a copy and specifies a copy subject, Since the contents distribution management processing program and copied history tracking processing program which perform a copy and which are operated as a copy control means are recorded only when it is the demand from a copy subject registered into the above-mentioned copy limit information, Based on contents DNA currently recorded on the contents copied unjustly, the source of release of an illegal copy can be traced easily.
[0142]The contents of the above-mentioned contents DNA can be effectively prevented from disturbance and concealing and leaking outside for the contents of the above-mentioned contents DNA.The illegal copy by the copy subject who is not a candidate for copy permission can be prevented.

CLAIMS

[Claim(s)]
[Claim 1]A contents distribution management device comprising:
A memory measure which memorizes information in connection with distribution management of contents or contents.
A copy control means to control copy execution of the above-mentioned contents.
A contents distribution management information recording device which is the information showing the history of information and a copy subject showing the history of the above-mentioned contents, generates contents distribution management information which can function as copied history information, and is recorded on a copy object field of both contents of a copied material and a copy destination.

[Claim 2]A contents distribution management device the above-mentioned contents distribution management information recording device's multiplexing the above-mentioned contents distribution management information, and recording it in the contents distribution management device according to claim 1.
[Claim 3]The contents distribution management device comprising according to claim 2:
A selecting means which the above-mentioned contents distribution management information recording device chooses single information from contents distribution management information currently multiplexed and recorded on a copy object field of the above-mentioned contents in the case of copy execution, and is read.
Information on one layer chosen [above-mentioned].
A merging means which generates the multiplexed new contents distribution management information based on information showing the history of a copy subject who copies.

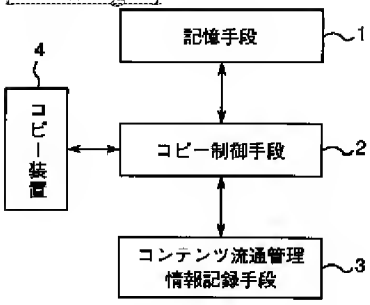
[Claim 4]It has a decussation means to perform decussation which exchanges a part of information between information which accomplishes a pair which constitutes contents distribution management information generated by the above-mentioned merging means in the contents distribution management device according to claim 3, A contents distribution management device, wherein the above-mentioned contents distribution management information recording device records contents managing distribution information which it crossed [above-mentioned].
[Claim 5]A contents distribution management device, wherein the above-mentioned decussation means controls a position of decussation between information which accomplishes the above-mentioned pair, width of decussation, and occurrence frequency of decussation in the contents distribution management device according to claim 4 based on a decussation function set up beforehand.
[Claim 6]A contents distribution management device, wherein it has a mutation means to which a part of contents distribution management information generated [above-mentioned] is mutated in the contents distribution management device according to claim 1 and the above-mentioned contents distribution management information recording device records contents managing distribution information which it varied [above-mentioned].
[Claim 7]A contents distribution management device, wherein the above-mentioned mutation means controls a position of the above-mentioned variation, the range of variation, and occurrence frequency of variation in the contents distribution management device according to claim 6 based on a mutation function set up beforehand.
[Claim 8]A contents distribution management device characterized by a copy object field of the above-mentioned contents being a unit relevant to structure of the contents concerned in the contents distribution

management device according to claim 1.
[Claim 9]A contents distribution management device having a copied history tracking means which pursues a history of a copy and specifies a copy subject in the contents distribution management device according to claim 1 based on contents distribution management information currently recorded on a copy object field of the above-mentioned contents.
[Claim 10]In the contents distribution management device according to claim 1, in a specific region which cannot be read in a logic instruction in the above-mentioned memory measure. Copy limit information including a copy subject's information that a copy was permitted is memorized for every contents, and the above-mentioned copy control means, Only when it is the copy subject by whom a demand copy subject is registered into the above-mentioned copy limit information with reference to the above-mentioned copy limit information before performing a copy, the above-mentioned contents distribution management information recording device is ordered generation of the above-mentioned contents distribution management information, A contents distribution management device, wherein the above-mentioned contents distribution management information recording device generates the above-mentioned contents distribution management information based on the above-mentioned instructions.
[Claim 11]In the contents distribution management device according to claim 10, the above-mentioned copy control means, A contents distribution management device forbidding execution of a copy or displaying a copy prohibition message when the above-mentioned demand copy subject is a copy subject who is not registered into the above-mentioned copy limit information.
[Claim 12]An information storing means which stores copy limit information which includes a copy subject's information that a copy was permitted, for every contents in a specific region which cannot read a computer by a logic instruction in a memory measure, A contents distribution management information creating means which generates contents distribution management information which is information showing the history of information and a copy subject showing the history of contents, and can function as copied history information, A decussation means to perform decussation which exchanges a part of information between information which accomplishes a pair which constitutes contents distribution management information generated [above-mentioned], A mutation means to which a part of contents distribution management information generated [above-mentioned] is mutated, An encoding means which enciphers contents distribution management information generated [above-mentioned], An electronic-watermark-information creating means which carries out electronic-watermark-information generation based on contents distribution management information enciphered [above-mentioned], and is recorded on a copy object field of both contents of a copied material and a copy destination, A decoding means which decrypts contents distribution management information currently recorded on the above-mentioned contents, and a copied history tracking means which pursues a history of a copy and specifies a copy subject based on contents distribution management information decrypted [above-mentioned], As a copy control means to perform a copy of the above-mentioned contents only when a demand copy subject is a copy subject registered into the above-mentioned copy limit information. A program recording medium in which computer read-out is possible, wherein a contents distribution management processing program and a copied history tracking processing program to operate are recorded.

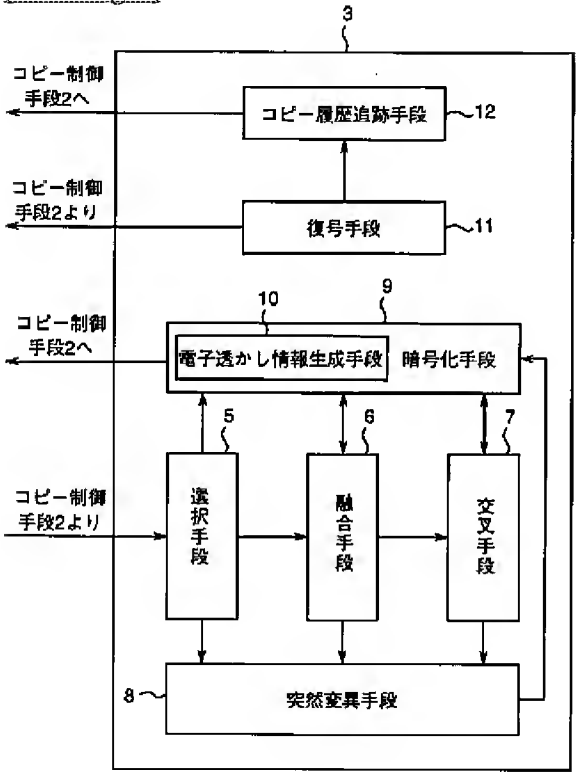
[Translation done.]

DRAWINGS

[Drawing 1]



[Drawing 2]



[Drawing 3]

(a)

50367－851－2655953－04370

(b)

hIwD5PKU2Wx0VCkBA/0ZZtbsz/pDekRErMw0Q4AF1UPdkK 8DeuhEOXzAq1Ddgj/4 PLVZHtiAxarDNjQ8M4Dt7jqer4Qat6HUZiRi8C2SjWihvgkahx 5RPFe1+C5aIfz2 YpRdjZ9LHmNifdCFik+Sow6P3NmAmzXbSEadUmLE8dDwM QVwIv7N/UmtT5OS9KYA AAA8imhwuvn48Lg6KUqgM6oa5VAu6l4jpcAT14u9OBmqFTb 2Snf9FDSjydNnx7Ia QuH2l4ee6r+qK1HMM/Zr =vzhT

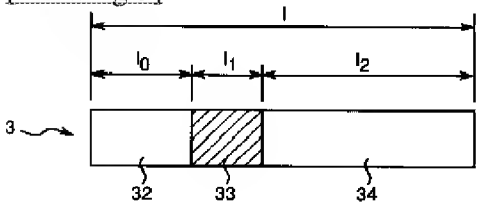
(c)

hIwD5PKU2Wx0VCkBA/0ZZtbsz/pDekREr

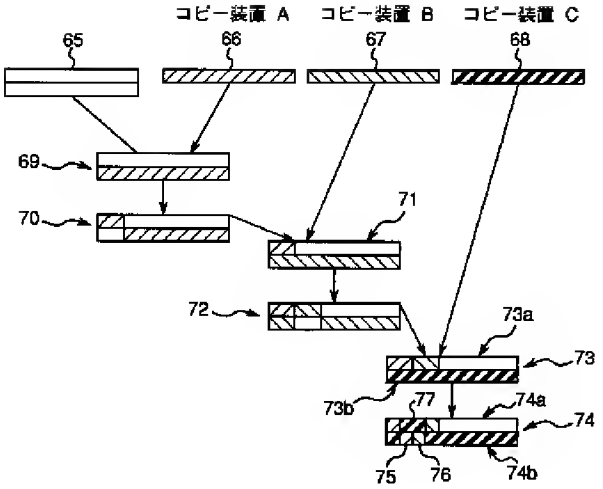
(d)

hIwD5PKU2Wx0VCkBA/0ZZtbsz/pDekREr
hIwD5PKU2Wx0VCkBA/0ZZtbsz/pDekREr

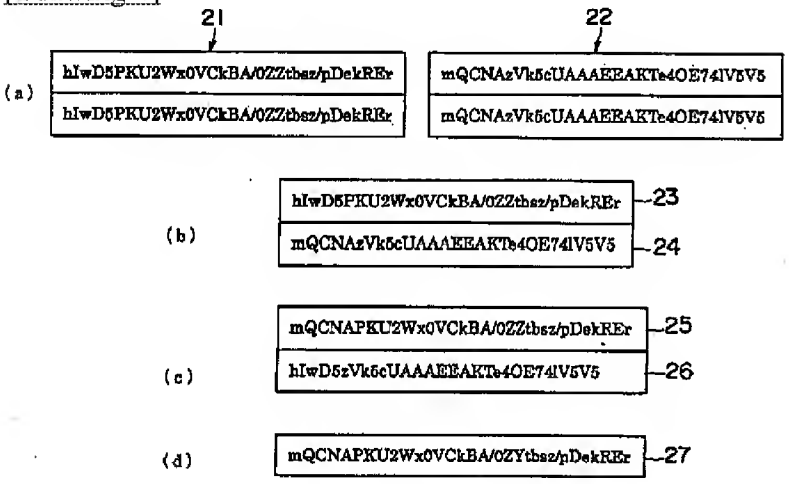
[Drawing 5]



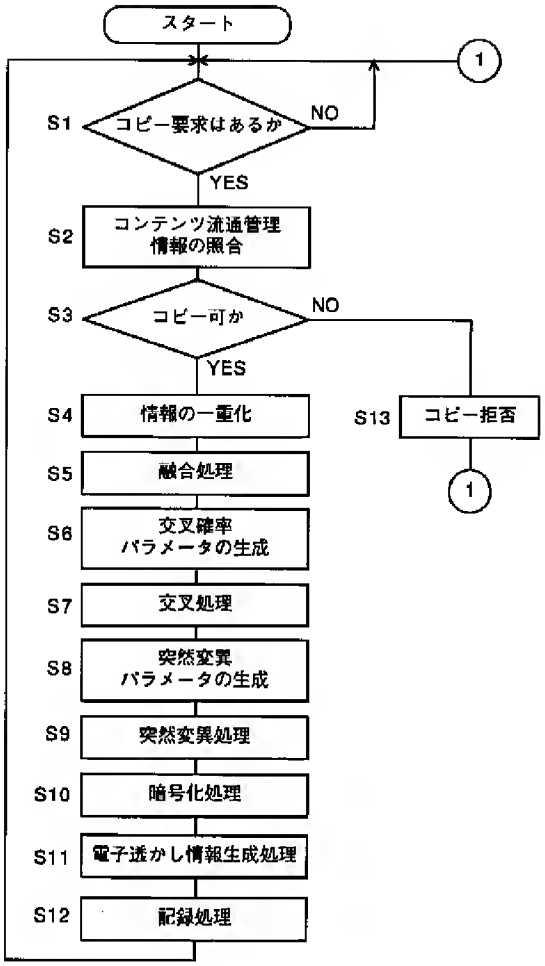
[Drawing 9]



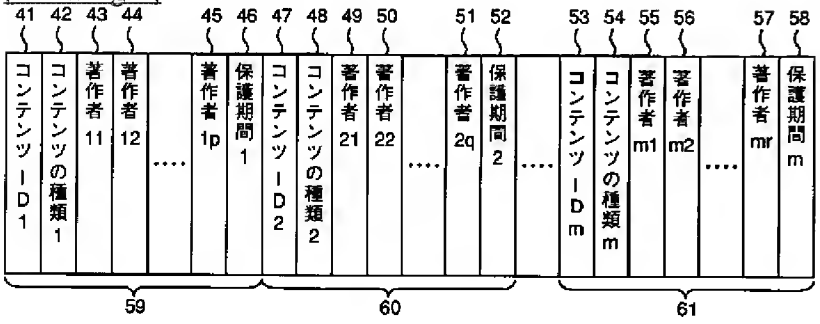
[Drawing 4]



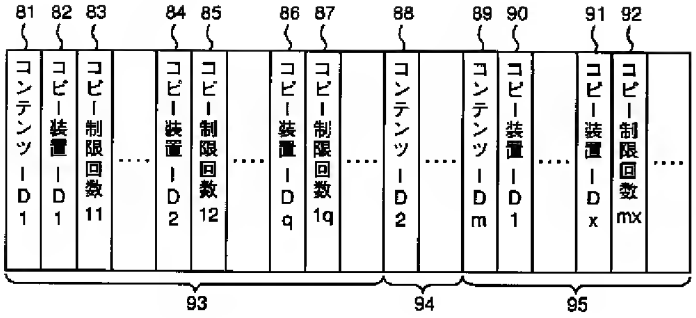
[Drawing 6]



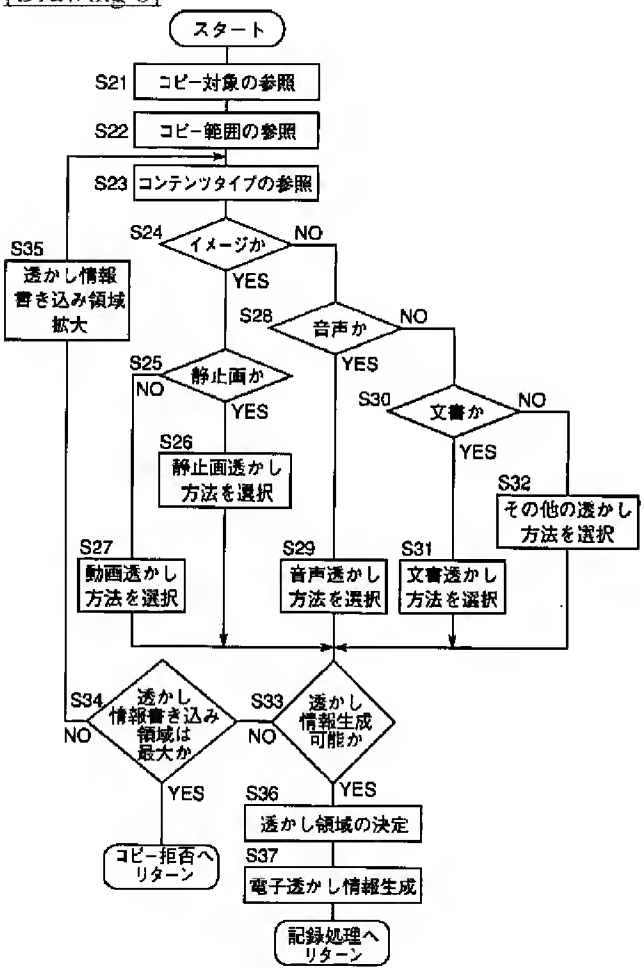
[Drawing 7]



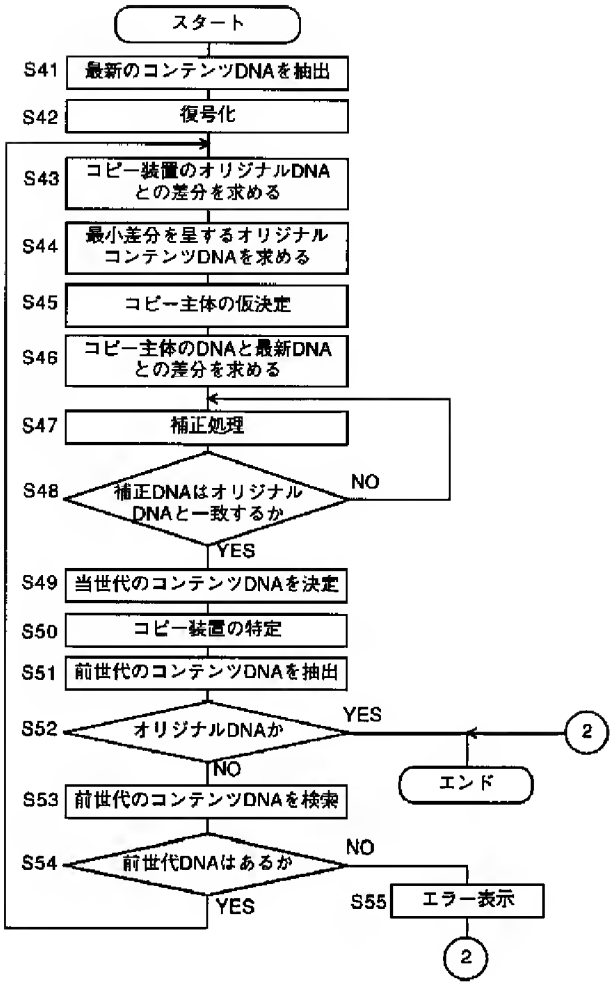
[Drawing 11]



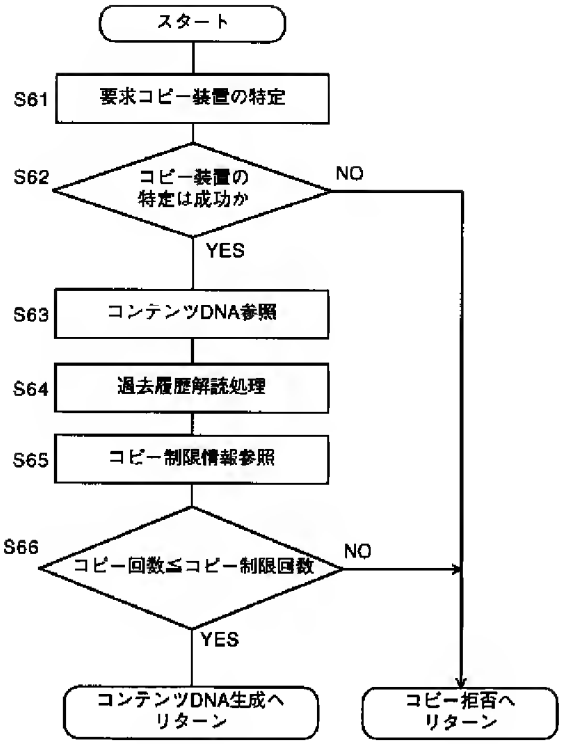
[Drawing 8]



[Drawing 10]


スタート
S41
最新のコンテンツDNAを抽出
S42
復号化
S43
コピー装置のオリジナルDNAとの差分を求める
S44
最小差分を呈するオリジナルコンテンツDNAを求める
S45
コピー主体の仮決定
S46
コピー主体のDNAと最新DNAとの差分を求める
S47
補正処理
S48
補正DNAはオリジナルDNAと一致するか
NO
YES
S49
当世代のコンテンツDNAを決定
S50
コピー装置の特定
S51
前世代のコンテンツDNAを抽出
S52
オリジナルDNAか
YES
NO
2
エンド
S53
前世代のコンテンツDNAを検索
S54
前世代DNAはあるか
NO
YES
S55
エラー表示
2

[Drawing 12]



[Translation done.]